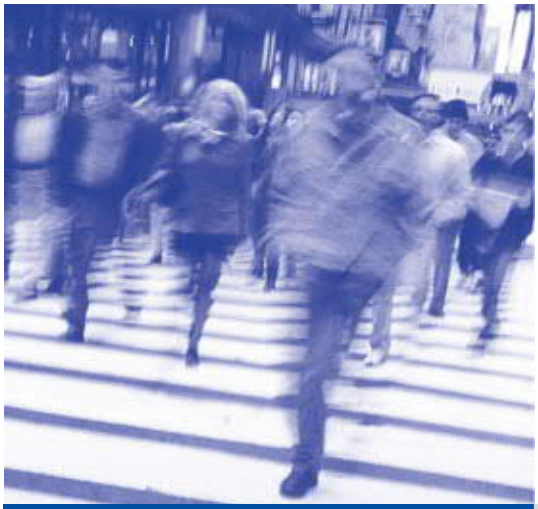

2020 CiVITAS
Cleaner and better transport in cities

ECCENTRIC

D4.3 Implementation of measures to make walking and cycling safer

Deliverable No.:	4.2
Project Acronym:	CIVITAS ECCENTRIC
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Responsible Co-Author(s):	
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2020 CiVITAS
Cleaner and better transport in cities
ECCENTRIC

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Abstract

Eccentric work package 4 comprises nine measures aiming to increase the safety and the share of walking and cycling in Madrid, Munich, Ruse, Stockholm and Turku.

This report focuses on the implementation of the five measures within the work package that aim to increase the safety of walking and cycling.

The experiences described in this report are good examples of the challenges of chosing the best test sites for walking and cycling safety measures – sites that support public and political acceptability, have maximum impact, and that enable measurability of the effects. An overarching theme with such measures, is the importance and complexity of early and detailed planning for data collection, ensuring data quality and comparability.

Cluster Partners

Organisation	Country	Abbreviation
Ayuntamiento de Madrid	Spain	AYTOMADRID
Stockholms Stad	Sweden	STO
Landeshauptstadt Muenchen	Germany	LHM
Obshtina Ruse	Bulgaria	RUSEMUN
Club Sustainable Development of Civil Society Association	Bulgaria	CSDCS

Document History

Date	Person	Action	Status	Diss. Level
19/12/18	Anne Bastian	draft based on input from measure leaders	draft	Measure leaders
17/12/18	Carlos Verdaguer	First format checking	Draft	
13/02/19	Carlos Verdaguer	Quality Check	Final draft	

Status: Draft, Final, Approved, and Submitted (to European Commission).

Dissemination Level: PC = Project Coordinator, SC=Site Coordinator, TC=Technical Coordinator, EM=Evaluation Manager.

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List of Acronyms

CSDCS	Club “Sustainable Development of Civil Society”
GIS	Geographic Information System
NGO	Non-Governmental Organization
SIS	Swedish Standard Institute
WP	Work Package

Executive Summary

Eccentric work package 4 comprises nine measures aiming to increase the safety and the share of walking and cycling in Madrid, Munich, Ruse, Stockholm and Turku.

This report focuses on the implementation of the five measures within the work package that aim to increase the safety of walking and cycling. In Madrid and Munich, saftety management systems - with new data integration and analysis tools - will be implemented. In Ruse, safer crosswalks and sidewalks will be constructed. And Stockholm is testing new ways of re-routing cyclists during construction work.

The overarching conclusions from the measures discussed in this report are:

- Importance of stakeholder involvement and alignment in every part of the process, and balancing of partly competing objectives
- Importance of chosing the best test sites for walking and cycling safety measures – sites that support public and political acceptability, have maximum impact, and that enable measurability of the effects.
- Importance and complexity of early and detailed planning for data collection, ensuring data quality and comparability.

1 Introduction

In the last decade, European cities have made significant steps forward in the delivery of sustainable urban mobility policies, proving that major impacts in terms of congestion and reduced emissions can be achieved through ambitious measures.

The main common challenges are to relieve central areas through clean and efficient urban logistics, as well as to increase the attractiveness and sustainable mobility of suburban districts. To tackle these common challenges, the cities of Madrid, Stockholm, Munich, Turku and Ruse have formed the CIVITAS ECCENTRIC consortium (European Commission, 2016).

The overall objective of the project is to demonstrate and test the potential and replicability of integrated and inclusive urban planning and sustainable mobility measures that increase the quality of life of all citizens in urban areas, with a particular focus on suburban districts and new developments and the clean organisation of urban freight logistics.

Work package 4 (WP4) comprises nine measures aiming to increase the safety (cluster 2) and widen the uptake (cluster 1) of walking and cycling in Madrid, Munich, Ruse, Stockholm and Turku, see table below. This report focuses on the implementation of the five measures within the work package that aim to increase the safety of walking and cycling.

Cluster	Measure	City	Partners
1	4.1 Innovative and participative approach to traffic safety	MAD	01 AYTOMAD
1	4.2 Software-controlled safety management of the road network	MUC	16 LHM
1	4.3 Providing secure pedestrian crosswalks	RUS	27 RUSEMUN 28 CSDCS
1	4.4 Safe sidewalks with cycling facilities towards the city centre	RUS	27 RUSEMUN 28 CSDCS
1	4.5 Policy for re-routing cyclists during construction work	STO	09 STO
2	4.6 Pedestrian friendly public space outside the city centre	MAD	01.AYTOMAD 02 GEA21
2	4.7 Enabling cycling outside the city centre	MAD	01.AYTOMAD 02 GEA21
2	4.8 Easy, safe and comfortable cycling and walking round the year	TUR	21TUR 25 TUAS
2	4.9 Offering test fleets of e-bikes and e-fright bikes	STO	14 CYKEL 09 STO

Table 1: Overview of the measures included in WP4

2 Explanation of the work implemented in WP4 Cluster 1: Measures to make walking and cycling safer

This measures in this cluster aim to increase the safety of walking and cycling. In Madrid and Munich, safety management systems - with new data integration and analysis tools - will be implemented. In Ruse, safer crosswalks and sidewalks will be constructed. And Stockholm is testing new ways of re-routing and protecting cyclists during construction work.

2.1 MAD 4.1 Innovative and participative approach to traffic safety

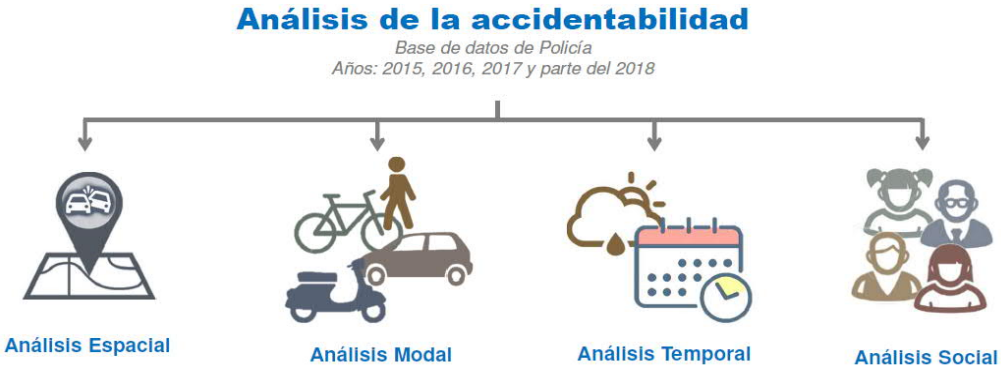

Figure 1: Accident Analysis

2.1.1 Introduction

This measure proposes the implementation of a software to improve road safety in the living lab area of Madrid. A GIS analysis of municipal police records and social media entries identifies, characterizes and locates road safety incidents, including those simply perceived by citizens. Citizens indirectly feed the application by being publicly active on social media, and they thereby participate in the process of improving mobility in their neighbourhood.

2.1.2 Implementation

Key steps

- Collecting information from the different stakeholders. Stakeholders include the municipal police and citizens.
- To geo-reference the different accident spots, as most of the accident registers do not have that information. This geo-referencing required a large effort.

Changes from the original plans

- Some of the expected relations between different variables did not provide useful results, so the variables were dropped from the analysis; for example, the state in which the vehicle is registered in was not a useful variable.

- We collected data about perceived security via social media data analysis, using a semantic message analysis tool for large databases.

Stakeholders involved in the different implementation steps

- Municipal police – providing accidents records and cooperating with the definition of different indicators for safety.
- Citizen participation – facilitating the registration of suggestions and complaints sent to Madrid City Council. Citizens also participated indirectly, by generating the social media entries that are the basis for the perceived road safety analysis.

Infrastructure required for the solution to function

- No infrastructure is required for this measure

Other related sustainable mobility solutions/measures

- Currently the implementation of this measure is not linked to any other measure

Timeframe

- The implementation was finished in November 2018, and took approximately 18 months. The demonstration phase has started.

2.1.3 Business model and contractual partnerships

- The measure is a municipal one, and is intended to scale up not only to the ECCENTRIC living lab area but to the whole city of Madrid, once the development is finished.

2.1.4 Critical challenges and success factors

Key challenges in implementation

- The obstacles are mainly bureaucratic ones, due to lack of experience in the municipality with related topics.
- The safety incident data is not geo-referred and police officers do not have the required tools for doing it. This means that it requires a lot of manual work to make the safety incident data useful for analysis.
- Preparing the documentation has been more time consuming than expected.
- For geo-referencing, a software tool was developed that links address data to a GIS systems, minimizing the number of manual registrations. The police is currently undergoing equipment modernization procedures, so it is expected that in near future, their own equipment will be able to geo-reference the safety incident spots.

Key success factors and minimum requirements

- The use of social networks and municipal complaints files instead of developing an app provides a less biased information. A key success factor is to select good keywords for the search tool.

2.1.5 Lessons learned from implementation

- As an outcome of this measure, it is intended to develop a guideline to support cities linking different safety incident datasets in a more efficient way.
- Answer is to be given once the data is collected.

2.1.6 Recommendations

- Data collection is fundamental and has to be well designed, i.e. all stakeholders have to be informed about the proper way of doing it, showing how to fill required fields, so links between variables could be easily and effectively created afterwards.

2.2 MUC 4.2 Software-controlled safety management of the road network

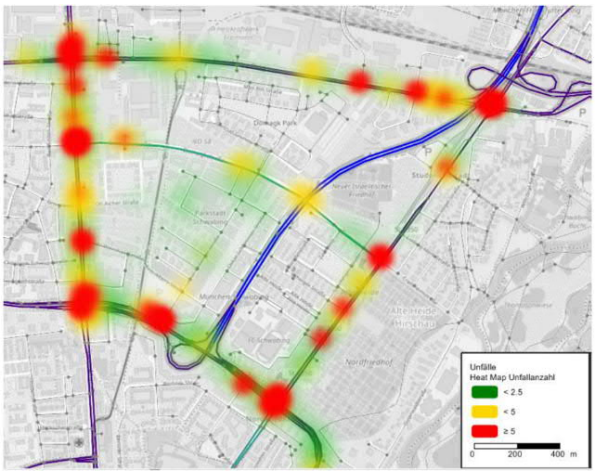

Figure 2: Accident heat map, living lab Munich

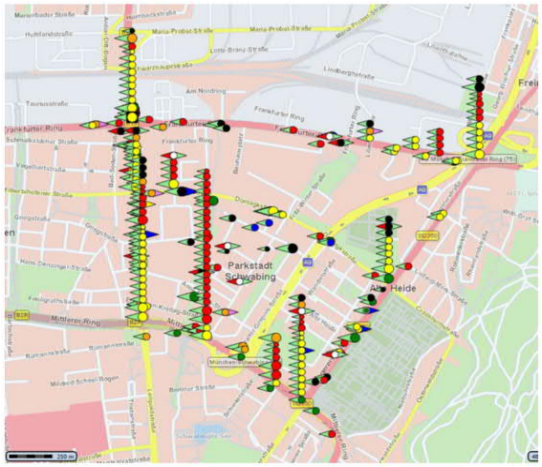

Figure 3: Spatial accident distribution, living lab Munich

2.2.1 Introduction

With ECCENTRIC the City of Munich will develop a new road safety concept and exemplarily show the potential of a new and innovative software-controlled safety management in the road network of the laboratory area Munich North to reduce the amount and consequences of accidents, especially for users of sustainable modes. Main project outcomes and respective evaluation results from the CIVITAS ECCENTRIC project will be a crucial basis for the design of a city-wide road safety management and a coherent infrastructure for the detailed analysis of accident data.

2.2.2 Implementation

Key steps

- Implementation of an intensive communication and planning process with all relevant stakeholders
- Subcontracting of traffic security experts for the
    - Inventory and in-depth analysis of the road safety situation in Munich North based on existing traffic accident data
    - Development of specific objectives to improve the road safety situation in Munich North
    - Development of a specific measure program for the implementation of defined objectives including resource planning and cost calculation
    - Development of a monitoring program to control the development of the road safety situation in the laboratory area and the achievement of objectives

- Identification of first measure implementation hotspots based on a hands-on road safety analysis together with measure stakeholders, especially local neighborhood associations
- Intensive discussions concerning the outcomes of the finalized expert inventory and in-depth analysis of the road safety situation in Munich North based on existing traffic accident data
    - Intersections between the scientific analysis of accident data and the 'felt dangers' of local inhabitants
    - Implementation potential of possible road safety measures (political and technical feasibility, costs, effectiveness)
- Development and implementation of an innovative road safety concept ('Vision Zero') for the entire City of Munich, based on replicable outcomes of the CIVITAS ECCENTRIC project
    - Principle program and strategy was approved in April 2018
    - First implementation program was approved in November 2018
- Preparation of the measure implementation and demonstration phase in 2019
    - Primary focus on realizable and effective measures (based on in-house and political discussions)
    - Identification of intersections with key objectives of the road safety concept for the entire City of Munich

Changes made from the original plans

- Extension of the initially scheduled planning phase due to the high political relevance and external effects of the measure
- Implementation of a multi-level approach with two main pillars, ensuring a strong stakeholder engagement:
    - A scientific analysis of the road safety in the laboratory area based on expert knowledge (subcontract)
    - An in-depth analysis of the road safety in the laboratory area (e.g. subjective road safety issues) in cooperation with local stakeholders, especially with local neighbourhood associations and local police representatives
- An early parallel process towards the implementation of the road safety concept for the entire City of Munich based on replicable outcomes of the measure → this was possible due to a supporting and accompanying political process

Stakeholders involved in the different implementation steps

- **Domagkpark Association (involved in all project phases)**
    - Project partner and most important contact person in the living lab concerning all current developments, political decisions, measure implementation issues, etc.
- **Residents (over neighborhood associations) (involved in all project phases)**
    - Participation in various measure planning workshops (e.g. analysis of 'felt/subjective dangers' of local inhabitants)
    - Frequent informal coordination processes concerning the road safety situation in the living lab (new safety hot spots, dangerous construction sites, etc.)
- **Schools (involved in all project phases)**
    - Safety on school routes is a crucial part of the entire road safety concept in the living lab → coordination and consultation processes concerning student catchment areas, dangerous hot spots, construction sites, etc.
- **Political representatives (involved in all project phases)**
    - Munich City council: Pre-consultation and final approval of the road safety concept for the entire City of Munich
    - District council: regular information about current developments in the ECCENTRIC living lab; consultation in case of necessary political coordination processes
- **Police (involved in all project phases)**
    - Regular coordination processes concerning the availability and analysis of a up-to-date accident data
    - Common composition of the road safety concept for the entire City of Munich
- **City administration (involved in all project phases)**
    - Approval and implementation of certain road safety measures in the living lab

Infrastructure required for the solution to function

- Currently no infrastructure is required. In the upcoming project phases there might be a need for the set up of new traffic signs and street barriers

Other related sustainable mobility solutions/measures

- Road safety is seen as a cross-sectional task with contact points to all Munich ECCENTRIC measures in the living lab. Especially concerning the social acceptance of sustainable mobility measures, the safety aspect is a crucial issue – sustainable mobility offers are only accepted if they are safe. Therefore, safety aspects of all Munich measures are considered in M4.2. and beyond, especially in the development of the implementation plan of the Munich road safety concept.

Timeframe

- The implementation of measures to improve the road safety in the living lab is seen as a long-term task and will be further pursued beyond the project. Within ECCENTRIC we will focus on the implementation of measures which:
    - have an effect on the most important road safety problems in the living lab
    - are realizable in a short and medium term
    - have a good replication potential

  The implementation of measures within ECCENTRIC is foreseen in 2019 / 2020. Measures with a high relevance but long-term implementation times (e.g. because of time intensive construction works) will be considered with a high priority in the ongoing implementation process of the Munich road safety concept.

2.2.3 Business model and contractual partnerships

- There are currently no contractual partnerships, the measure is related to the measure leading institution (Department of Public Order, City of Munich). A traffic security expert was subcontracted from 07/2017 until 11/2018 to support the development of objectives and measures to improve road safety in the living lab.
- The measure is currently only financed by CIVITAS ECCENTRIC. Potentially some parts of measures to be implemented in the living lab in 2019/2020 will be co-financed by other city administration resources. Critical challenges and success factors

Key challenges in implementation

- A measure plan was developed / proposed from a road safety expert as an output of a subcontract. The plan includes various approaches for the improvement of road safety in the living lab. Some measure proposals are already quite detailed, some are more on a generic level. To point the relevance of certain measures, all approaches are categorized concerning:
    - Effectiveness
    - Costs
    - Feasibility

  Key challenge is now to evaluate all measure proposals and to weight the categories against each other. E.g. it might happen that very effective measures are not feasible due to high costs and very long construction times. Intensive in-house and political discussions are necessary to identify appropriate measures to be implemented in 2019 / 2020.

Key success factors and minimum requirements

- Main key success factor (and also minimum requirement) was the very detailed analysis of the road safety situation in the living lab, showing (i) conflict situations, (ii) means of transport and (iii) spatial location for all accident situations happened. Based on this data, a very precise objective and measure program could be developed.

2.2.4 Lessons learned from implementation/replicability

- Being aware of a very intensive measure planning process including all relevant stakeholder groups and ensuring a strong political backup (already mentioned in D 4.1)
- Conducting a comprehensive inventory and in-depth analysis of the road safety situation in the target area (already mentioned in D 4.1)
- Developing a well concerted measure implementation concept to improve the road safety situation in the target area, with a strong focus on high priority measures and a conservative resource management (already mentioned in D 4.1)
- Analyse all planned measures concerning effectiveness, costs and feasibility. It might happen that the most effective measure is not the most feasible one.

2.2.5 Recommendations

- See previous point ‘lessons learned from implementation’
- The final measure and monitoring implementation program must be the result of an intensive political consulting process in order to ensure broad acceptance and a positive external /medial representation of the measure achievements (already mentioned in D 4.1).
- The new and preventive road safety concept for the ECCENTRIC laboratory area will be also based on an innovative software solution, enabling the use of geoformation analysis. The selection of appropriate software tools must be strongly adjusted to available (expert) knowledge of staff working within the local road safety management infrastructure (already mentioned in D 4.1).

2.3 RUS 4.3 Providing secure pedestrian crosswalks

Figure 4: Pedestrian crossing in Ruse

2.3.1 Introduction

The existing pedestrian crossings in the peripheral district of Druzhba, in Ruse, are not secure enough and present a high risk for accidents, leading to injuries and fatalities. Most people with disabilities avoid walking on streets, in general, or around the city due to the lack of basic infrastructure. Druzhba is Ruse's 'living lab' (or demonstration/pilot area) in CIVITAS ECCENTRIC, and one of the entrances to the city centre with high volumes of traffic.

This measure analyses the crossings in the peripheral neighbourhood and secures them with LEDs, raised paths, etc. Additionally, cameras for video surveillance will be installed at junctions in the district.

2.3.2 Implementation

Key steps

The following activities have been implemented during the measure's research and planning phase:

- Planning and research activities on innovative solutions for securing pedestrian crossings.
- Meetings with experts in the field.
- Analysis of the crossings available in the district and research into best practice for improved designs with safety and security in mind.

- Identifying the best locations for implementation of the new pedestrian crossings – close to focal points of pedestrian traffic – shopping areas, schools, main roads and streets leading to the city centre.
- Dissemination of the measure idea in order to appraise citizens' reaction.
- Development of technical specifications.

Ruse Municipality has performed a contract selection procedure (launched in April 2018) and has signed a contract for designing secure pedestrian crossings. After the design is ready, Ruse Municipality will contract the necessary construction works.

Stakeholders involved in the different implementation steps

- Ruse has collected feedback from people living in the district during meetings and through the Mayor's social media channels. The information received was taken into consideration when choosing the exact spots for positioning the new crosswalks.

Infrastructure required for the solution to function

- No prerequisites, but the measure itself includes construction work.

Other related sustainable mobility solutions/measures.

- There is also an investment in safer cycling paths ongoing, see measure 4.4.

Timeframe

- Both the design and the construction of the new crosswalks are expected to be completed in four months (in total). The latest estimate for the finalisation of the construction of the safe crossings is the beginning of Spring 2019. The current winter conditions do not allow the start of the construction.
- The longer terms aim of this measure is to reduce the number of road accidents involving pedestrians and to make walking a safer and more desirable way of travelling in the district and the city. The shorter-term goal is to build safe infrastructure for pedestrians, including people with disabilities.

Expected impacts

- A decrease in the number of accidents.
- Increase in the share of walking in the modal split in Druzhba - currently at 44%.
- Increase in the use of public transport by people with disabilities living in the district. The safer pedestrian crossings should provide better mobility conditions for the people with disabilities, which should allow them to use the pedestrian infrastructure in the district and provide better access to the PT service.

Ruse Municipality will construct at least two innovative, secure, pedestrian crossings as pilots in Druzhba. Ruse plans to construct additional crossings, like those piloted, in the next years, should the demonstration and monitoring phase of the pilots show that these are well-accepted by residents of the district. In fact, Ruse is ready to upscale the measure to the whole city and construct such innovative secure pedestrian crossings in other neighbourhoods, if those constructed via CIVITAS ECCENTRIC turn out to be a success, and the community requires more solutions like this.

2.3.3 Business model and contractual partnerships

- The owner of the measure is Ruse Municipality.
- The procurement of the construction work has not taken place yet. Private companies will execute the construction.
- It is funded through CIVITAS ECCENTRIC. The planned total budget for the measure is 123,282 Euros, including 71,000 Euros for design and construction of the crossings, and 16,000 Euros for equipment costs.

2.3.4 Critical challenges and success factors

Key challenges in implementation

- So far, the key challenge for the implementation of the measure was to identify the most suitable locations for the new pedestrian crossings and to receive the acceptance of the community for this. This has been overcome by carrying out an exhaustive analysis of the situation in the Druzhba district and an analysis of the behaviour of citizens – their walking habits, preferred paths of movement around the district, points of interest, etc. Additionally, there were discussions with citizens in different formats – information events, round tables, interviews, questionnaires, social media, etc.

Key success factors and minimum requirements

See above, key success factors are citizen involvement and thorough analysis.

2.3.5 Lessons learned from implementation

So far, we can give the following instructive advice and recommendations to other cities considering replicating this measure:

- To carefully analyse the existing crossings in terms of convenience and safety for the citizens;
- To analyse the behaviour of citizens – their walking habits, preferred paths of movement around the district, points of interest, etc.;
- To discuss possible solutions with citizens living in the district in order to come up with best solutions to satisfy their needs and to have their support during the planning and implementation of the measure;
- To communicate in advance to the citizens the chosen locations for the new crossings in order to receive their acceptance and support;
- To look for best practices and solutions in the CIVITAS website – there are lots of ideas implemented in other cities that can be replicated in other destinations facing similar challenges.

2.3.6 Recommendations

- See above, lessons learned.

2.4 RUS 4.4 Safe sidewalks with cycling facilities towards the city centre

Figure 5: Sidewalk in Ruse

2.4.1 Introduction

The poor state of the pavements (sidewalks) and cycling lanes in Ruse's Druzhba district generates a high risk of road accidents involving pedestrians and cyclists, as these often result in people opting for using roads when they head towards the city centre. Currently, the footpaths on both sides of the main roads, connecting Druzhba with the central areas of the city, are either incomplete or are in a very bad state of disrepair, and are unsafe for walking or cycling.

In this measure, the Municipality of Ruse and the non-governmental organisation (NGO) CSDCS (Club "Sustainable Development of Civil Society"), carry out research of good practice and innovative solutions on designs of safe pavements (which are to be shared with cyclists) in Druzhba connecting it to the city centre. Following their construction (and securing them with appropriate facilities) they will be promoted to the public. Pavements will be constructed along parts of the main roads only, as this is a pilot case.

2.4.2 Implementation

Stakeholders involved in the different implementation steps

- Ruse has collected feedback from people living in Druzhba during meetings and through the Mayor's social media channels. The information received was taken into consideration when choosing the sections of the main roads where the new pavements and cycling lanes would be built - close to focal points of pedestrian and cyclist traffic.
- Information about the measure and its promotion to various stakeholders and the general public is being undertaken via the Information, Training and Awareness Raising measure Ruse is implementing in parallel to this one. More specifically, this will be done via three training seminars organised by CSDCS - for professionals working in transport (in February 2018), for Druzhba residents (in May 2018), and locally-based NGOs (in September);

Other related sustainable mobility solutions/measures

- There is also an investment in safer pedestrian crossing ongoing, see measure 4.3.
- As mentioned already, parts of the areas in need of safer pavements will be built in this measure. Following the demonstration, monitoring and evaluation phases, the measure will be upscaled to the remainder of the area. In fact, Ruse is ready to upscale the measure to the whole city and constructing such pavements in other neighbourhoods, if those constructed via CIVITAS ECCENTRIC turn out to be a success, and the community requires more solutions like this one.

Timeframe

- Design of the safe pavements and cycling paths was contracted out by Ruse during 2018. Construction of the pavements will follow the design phase.
- Both design and construction of the new pavements are expected to be ready in three to four months (total), The latest estimate for the finalisation of the construction of the safe sidewalks is the beginning of Spring 2019. The current winter conditions do not allow the start of the construction.

2.4.3 Business model and contractual partnerships

- The owner of the measure is Ruse Municipality.
- The procurement of the construction work has not taken place yet. Private companies will execute the construction.
- The measure is funded by CIVITAS ECCENTRIC and has a total planned budget of 127,032 Euros.

2.4.4 Critical challenges and success factors

Key challenges in implementation

- So far, the key challenge for the implementation of the measure was to identify the most suitable sections of the roads leading to the city centre where to implement the new safe sidewalks and to receive the acceptance of the community for this. This has been overcome by carrying out an exhaustive analysis of the situation in the Druzhba district and analysis of the behaviour of citizens – their walking habits, preferred paths of movement around the district, points of interest, etc. Additionally, there were discussions with citizens in different formats – information events, round tables, interviews, questionnaires, social media, etc.

Key success factors and minimum requirements

- Extensive analysis in the planning phase and citizen involvement are important for selecting the right locations and the right solutions in those locations.

2.4.5 Lessons learned from implementation/replicability

See recommendations below.

2.4.6 Recommendations

So far, we can give the following instructive advice and recommendations to other cities considering replicating this measure:

- To carefully analyse the cycle paths in terms of convenience and safety for the citizens;
- To analyse the behaviour of citizens – their cycling habits, preferred paths of movement around the district, points of interest, etc.;
- To discuss possible solutions with citizens living in the district in order to come up with best solutions to satisfy their needs and to have their support during the planning and implementation of the measure;
- To communicate in advance to the citizens the chosen locations for the new cycling facilities in order to receive their acceptance and support;
- To look for best practices and solutions in the CIVITAS website – there are lots of ideas implemented in other cities that can be replicated in other destinations facing similar challenges.

2.5 STO 4.5 Policy for re-routing cyclists during construction work

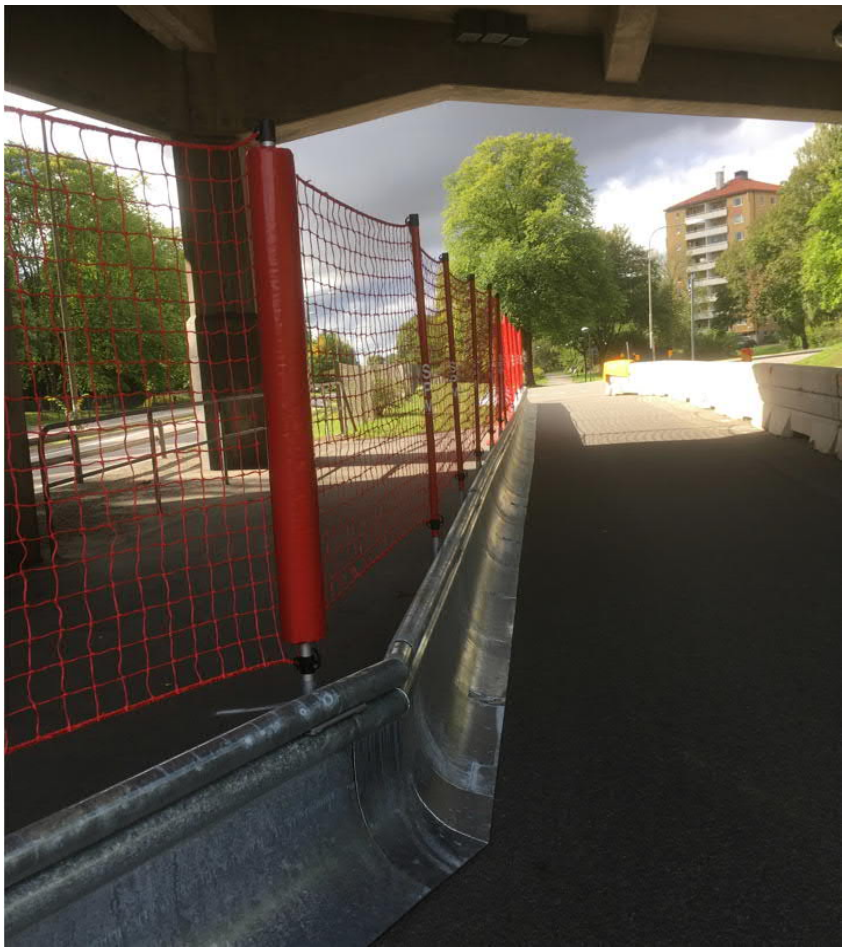

Figure 6: Cycling safety fence

2.5.1 Introduction

The intended outcome of this measure is to write a city policy with the purpose of having better and safer routes for cyclists when passing construction sites. The information gathered during the policymaking will also be integrated with other documents used by the City of Stockholm. For example, the information gathered will be used to update the technical manual, which is mandatory to follow when working at road construction sites.

We test new innovative safety materials for construction sites, focusing on cyclists. The aim is to identify if new the materials improve the actual and perceived safety of cyclists, so that they continue to cycle, either by still taking the route along the construction site, or where possible choose a nearby alternative route that is also safe and convenient.

Another part of the project, is to work with the Swedish standard institute (SiS) to create a new national standard for materials used at constructions sites with cyclists' safety in mind.

2.5.2 Implementation

Key steps

- Demonstration of new materials during the European Mobility week. We demonstrated the safety materials for construction sites to citizens. We engaged with citizens by collecting their opinions regarding the materials.
- Develop a new policy for cycling construction sites in the City of Stockholm. We might integrate this policy into existing guidelines, or develop it as a separate policy.
- Collaborate with the Swedish Standard Institute to develop a new Swedish standard for materials used during construction work affecting cyclists.

Changes made from the original plans

- Initially there was a mobile phone app planned, that would inform cyclists about current construction sites. Up until now we have not developed an app. We are still investigating if and how we can include an app development in the project.
- The timeline for the second construction site material test has been moved to a later point in time, probably early spring 2019. Partly this is because we want to avoid the impact of snow and cold on the measurements, because these weather conditions would mean fewer and different types of cyclists.

Stakeholders involved in the different implementation steps

- The companies that demonstrated their materials have been involved in making the demonstration happen.
- The Swedish Standard Institute is leading the work regarding the development of the new material standard. Stockholm City's transport administration is supporting them in this work, by sharing their experiences.

Timeframe

- What has taken the most time is to find construction sites where the tests can be executed, and this affects the planning time, because detailed planning can only happen once the test site is known. Even the policy development timeline is dependent on finding the test sites and executing the tests first.

2.5.3 Business model and contractual partnerships

- The City of Stockholm owns the measure (developing a new construction manual, and testing materials) but the Swedish Standard Institute owns the work regarding the new Swedish standard.
- The construction site material is owned by the companies that produce and implement the materials at the construction sites.
- The measure is fully financed by Eccentric funds.
- In the future, we might cooperate with other parts of Stockholm City's transport administration at different construction sites, and share the material and implementation costs with them.

- The materials used in the test sites have been provided free of charge by the manufacturers, for demonstration use. It is not clear yet how the costs of the new materials will compare to costs of previously used materials, but there is a potential for higher costs.

2.5.4 Critical challenges and success factors

Key challenges in implementation

- The key challenges in the implementation has been to find a place for the second demonstration, which is why it has taken longer to plan it, this has not been overcome jet. It is difficult to find an appropriate test site because the construction site needs to:

    - Affect cyclists in a significant way, this means a high number of cyclists, on nearby safe and pleasant alternative routes, and a notable impact of the construction work on cyclists
    - Provide good comparability to other test sites
    - There needs to be an opportunity for measuring cycle flows before the construction begins, so the test site needs to be identified early before any impact on cyclists occurs.
    - The site and its surroundings need to be appropriate for interviewing cyclists, and also to observe and measure their travel behaviour.

- The biggest administrative challenge has been the administration of the measure, because several people involved in the project have changed jobs or assignments. We overcame this with help from Eccentric and by taking help from consultants.
- One analytical challenge in safety projects like this one is to measure the impact on minor injuries, because minor injuries usually do not get recorded by police or hospitals.
- Another challenge is to collect positive feedback to identify what worked well, without too much respondent selection bias. There tends to be a bias towards engaging and reporting when things do not go well.
- When measuring the impact of the measure on cycling flows it is important to have a benchmark site that is not affected by any construction or any tests. This is because cyclist counts are very dependent on weather conditions, so a variation in weather can easily cause larger effects than the measure itself.
- Another learning is the importance of limiting unnecessary disturbances for citizens and balancing that with the need for testing and learning. For example, when we demonstrated the new safety materials at a location that did not have any underlying need for construction, cyclists disapproved and perceived it as an unnecessary disturbance.

Key success factors and minimum requirements

- The biggest success was that we managed to have three tests early in the project to get a good idea about what material solutions the market had to offer and to get a good idea about what we needed to work more with.
- Other key success factors are to identify appropriate test sites and to plan the effect measurement early on, see above.

2.5.5 Lessons learned from implementation

- Make sure you have good test sites, see above.
- Plan the evaluation well in advance. For example, collect prior-measurements before any action or construction occurs, make sure you have a benchmark site that is unaffected by the measure, and measure effects on cyclist flows even on nearby alternative routes.
- Talk to other cities, to get an idea about how different cities work and get new ideas, like the work that we have done with the Swedish Standard Institute.
- We should have interviewed more cyclists at the test sites, to get their opinions regarding the construction materials tested and the re-routing.
- Plan a second test closer in time to the first one, and plan the effect measurements well in advance.

2.5.6 Recommendations

See above.

3 Lessons learned from implementation

All measures in this report highlight the importance of involving citizens, political stakeholders and administrative stakeholders in all phases of the project, detailed objective and priority setting, and detailed planning and prioritizing before implementation. The Munich, Ruse and Stockholm experiences show that selecting the sites for the measures is key for the impact, for the measurability of the impact, and for the acceptability of the measure.

The Madrid experience highlights the practical difficulties of collecting, standardizing and georeferencing safety records from different sources and IT systems. The Madrid and Stockholm experiences are examples of the importance of data definition and comparability, early planning for the analysis phase, and how such challenges can significantly affect the project workload and the schedule.

One general challenge of safety measures, is to affect and measure perceived safety and to measure effects on minor (unreported) injuries. To avoid the respondent bias of surveys or municipal feedback forms, one solution is to passively collect data, e.g. the social media data mining in Madrid, or to use other observational studies and measurements.

The Munich experience in particular highlights trade-offs between the feasibility, affordability and effectiveness of different safety measures. Negotiations, priority setting, and alignment at political and administrative level are an important and time-consuming part of the process.

4 Conclusions and Next Steps

An overarching theme in the experience of Madrid, Munich, Ruse and Stockholm with walking and cycling safety measures, is the importance and complexity of early and detailed planning for data collection, ensuring data quality and comparability.

The experiences described in this report provide good examples of the challenges of choosing the best test sites for walking and cycling safety measures – sites that support public and political acceptability, have maximum impact, and that enable measurability of the measure effects.

In 2019 the implementation phase of the Munich, Ruse and Stockholm test sites will continue; and the Madrid measure will continue its demonstration phase.

5 Sources /References

The source for the information collected in his report are the experiences reported by the measure leaders.